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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/512,107	KUMAGAI ET AL.	
	Examiner	Art Unit	
	Thoi V Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6 and 16-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3,5,6 and 18* is/are allowed.

6)☒ Claim(s) *2,4,16,17 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Amendment filed August 20, 2004. Accordingly, claims 1 and 7-15 were cancelled, and new claim 19 was added. Currently, claims 2-6 and 16-19 are pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "wherein said semiconductor film is formed in a region where any opaque metal film is not formed" recited in the claim is not supported by the drawings. As shown in Fig. 13 (sectional view), the semiconductor layer 105a is formed in a region where the pixel electrode 113 and the drain electrode 108 (opaque material) are formed. In addition, the claim recites three substrates: a transparent substrate, a first substrate and a second substrate while the specification discloses only two substrates, a first insulating substrate and a second insulating substrate.

Claim Objections

4. Claim 19 is objected to because of the following informalities: claim 19 recites the limitation "the same film" in line 8. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sawayama et al. (USPN 6,184,960 B1) in view of Shimada et al. (US 6,052,162) and Kiryu et al. (US 5,368, 962).

As shown from Figs. 23 and 24, Sawayama et al. discloses a method for manufacturing a reflective type liquid crystal display wherein two transparent insulating substrates, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material is held between said two transparent insulating substrates (see also Fig. 22), the method including the steps of:

forming scanning lines 202, a scanning electrode 33, and common electrode wiring 204 (capacitance line) on a transparent insulating substrate 201 (col. 22, lines 20-28);

forming an insulating film 205 on said scanning lines, said scanning electrode and said common electrode wiring;

forming a semiconductor layer 206 on said scanning electrode through said insulating film;

forming a first electrode 209 and a second electrode 209' forming a semiconductor element 210 with said semiconductor layer 206, and forming signal lines 209;

applying photosensitive positive-type resin 222 on said first electrode, said second electrode, and said signal lines and exposing said photosensitive resin (see Figs. 26B and 26C, and col. 23, lines 6-8);

forming an interlayer insulating film 211 having a contact hole 212 at a predetermined position and desired unevenness on the surface by applying a development (see Figs. 26B-26D and col. 23, lines 6-9); and

forming a reflex picture element electrode 213 having a configuration of the transferred unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode 209' through said contact hole 212 by forming a high reflex metal film (Al) on said interlayer insulating film and in said contact hole, and conducting pattern (see Fig. 26G, col. 22, lines 61-64 and col. 23, lines 11-15),

wherein the exposure for forming desired unevenness on an interlayer insulating film 29 is conducted only from a front side (see Figs. 7C-7G).

Sawayama et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 16 except for forming an interlayer insulating film composed of a photosensitive positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength; and sticking an ultraviolet-cut film on a face of the transparent insulating film opposite to the face where said photosensitive positive-type resin is applied.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Sawayama et al. with the teaching of Shimada et al. by forming an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to improve the display brightness (col. 5, lines 38-42 and col. 9, lines 29-48).

Further, Kiryu discloses a masking film comprising a peelable, transparent ultraviolet-cut film provided on a transparent substrate for cutting ultraviolet rays having a wavelength of 450 nm or less (col. 2, lines 33-40).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Sawayama et al. with the teaching of Kiryu by sticking an ultraviolet-cut film on a face of the transparent insulating substrate opposite to the face where said photosensitive positive-type resin is applied for cutting ultraviolet rays having a wavelength of 450 nm or less to improve the display workability during exposure to actinic light in the photomechanical reproduction process (col. 1, lines 10-16 and 38-41).

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sawayama et al. (USPN 6,184,960 B1) in view of Shimada et al. (US 6,052,162).

As shown from Figs. 23 and 24, Sawayama et al. discloses a method for manufacturing a reflective type liquid crystal display wherein two transparent insulating substrates, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material is held between said two transparent insulating substrates (see also Fig. 22), the method including the steps of:

forming scanning lines 202, a scanning electrode 33, and common electrode wiring 204 (capacitance line) on a transparent insulating substrate 201 (col. 22, lines 20-28);

forming an insulating film 205 on said scanning lines, said scanning electrode and said common electrode wiring;

forming a semiconductor layer 206 on said scanning electrode through said insulating film;

forming a first electrode 209 and a second electrode 209' forming a semiconductor element 210 with said semiconductor layer 206, and forming signal lines 209;

forming an interlayer insulating film 211 having a contact hole 212 at a predetermined position and desired unevenness on the surface by applying a development (see Figs. 26B-26D and col. 23, lines 6-9); and

forming a reflex picture element electrode 213 having a configuration of the transferred unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode 209' through said contact hole 212 by forming a

high reflex metal film (Al) on said interlayer insulating film and in said contact hole, and conducting pattern (see Fig. 26G, col. 22, lines 61-64 and col. 23, lines 11-15).

As shown in Figs. 6A, 6B and 7A-7I, Sawayama et al. discloses the method of forming the interlayer insulating film in detail comprising:

forming an interlayer insulating film 24 at a predetermined position and desired unevenness on the surface by conducting exposure to UV light using a mask A(25) and development (Figs 7C and 7D) and forming another interlayer insulating film 28 having desired unevenness on the surface of the interlayer insulating film 24 by conducting exposure at a different exposure amount using another mask B(27) and development (Figs. 7F, 7G and 7H) (col. 15, lines 31-43),

wherein the exposure for forming unevenesss on the interlayer insulation film is conducted only from a front side.

Sawayama et al. discloses a reflective type liquid crystal display that is basically the same as that recited in claim 16 except for forming an interlayer insulating film composed of a photosensitive positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of

Sawayama et al. with the teaching of Shimada et al. by forming an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to improve the display brightness (col. 5, lines 38-42 and col. 9, lines 29-48).

8. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawayama et al. (USPN 6,184,960 B1) in view of Shimada et al. (US 6,052,162) and Takatsu et al. (USPN 5,434,026).

As shown from Figs. 5A and 5B, Sawayama et al. discloses a method for manufacturing a reflective type liquid crystal display, comprising:

forming plural scanning lines 10 and plural signal lines 11 crossing said scanning lines on an insulating substrate; and

forming a switching element 17 in each of picture element regions divided by said scanning lines and said signal lines.

As shown in Figs. 7A-7I, the method of Sawayama et al. further includes

the step of forming an interlayer insulating film 29 having appropriate unevenness of an inseparable pattern in the picture element region and having a contact hole 42 of a separable pattern on a drain electrode 19 of said switching element by plainly applying a photosensitive insulating resin on said substrate so as to dissolve difference in level caused by said scanning lines, said signal lines, and said switching element, and conducting exposure and development while changing an amount of exposure (col. 15, lines 32-44); and

the step of forming a reflex picture element electrode 4 having unevenness due to said interlayer insulating film at a position conforming to each of the picture element regions and which is electrically connected to said switching element through said contact hole, by patterning after forming a high reflex film on said interlayer insulating film (Fig. 7I),

wherein in the process of forming the interlayer insulating film, the insulating resin is exposed by divisional (split) exposure in which the inseparable pattern and the separable pattern are exposed by different masks as shown in Figs. 6A, 6B, 7C and 7G; and

wherein the exposure for forming unevenness on the interlayer insulation film is conducted only from a front side.

Sawayama et al. discloses a method for manufacturing a reflective type liquid crystal display that is basically the same as that recited in claims 2 and 4 except for an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength; and the exposure value of the separable pattern and the inseparable pattern.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of

Sawayama et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness (col. 5, lines 38-42 and col. 9, lines 29-48).

Further, Takatsu et al. discloses a quick and accurate method of determining exposure conditions for an exposure device such as a stepper for manufacturing a liquid crystal display device (col. 1, lines 12-19). As shown in Fig. 1C, a photoresist layer at position b1 is exposed to light intensity of 20 and a photoresist layer at position a1 is exposed to light intensity of 75 so as to obtain an accurate film reduction (col. 3, lines 24-27 and col. 4, lines 27-31). Accordingly, the photoresist layer at position b1 is exposed by a predetermined exposure amount of 27 % of the exposure amount for the photoresist layer at position a1.

Thus, it would have been obvious that the method of Takatsu et al. is applicable for predetermining exposure conditions for the separable pattern and the inseparable pattern so as to obtain a desired insulating resin having appropriate unevenness of the inseparable pattern in the picture element region and having a contact hole of the separable pattern (col. 3, lines 24-27 and col. 4, lines 27-31).

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and Mei et al. (USPN 6,140,668).

As shown in Figs 1 and 2, Tsuda discloses a reflection type liquid crystal display comprising:

a transparent insulating substrate (first substrate) 201;

scanning lines 204, a scanning electrode 203, and common electrode 205 wiring formed on said insulating substrate;

an insulating film 207 formed on said scanning lines, said scanning electrode and said common electrode wiring;

a semiconductor layer 208 (see also Fig. 3C) formed on said scanning electrode through said insulating film;

a first electrode 212 and a second electrode 213 forming a semiconductor element with said semiconductor layer, and signal lines 211 connected to said first electrode;

an interlayer photosensitive insulating film 240 which is formed on said first electrode, said second electrode and said signal lines, absorbs difference in level of said scanning lines, said first electrode, said second electrode and said signal lines, and possesses minute unevenness on the surface (col. 9, lines 12-25) serving as an inseparable pattern on the surface (Fig. 2);

the first transparent substrate 201 (col. 1, lines 52-54) having a reflex picture element electrode 423 composed of a high reflex metal film Al (col. 9, lines 47-50) having a configuration transferred to said interlayer insulating film as the unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through a contact hole provided in said interlayer insulating film (Fig. 5B) and serving as a separable pattern; and

a second transparent substrate 301 sandwiching and holding a liquid crystal material 250 with said first substrate (col. 1. lines 52-54),

wherein each pixel region, which corresponds to each island-shaped light-shielding area 260, excludes the region where said scanning lines, said signal lines are formed and said contact holes as shown in Fig. 8 (col. 10, lines 48-65 and col. 11, lines 20-25).

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 19 except for an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength, and a semiconductor film composed of the same film as said semiconductor layer and formed in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed.

At first, as shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness.

Further, as shown in Figs. 7 and 10, Mei et al. discloses a liquid crystal display comprising an a-Si semiconductor layer 64 (as 52 in Fig. 4; col. 4, lines 39-41) and an a-Si semiconductor film 68 which is provided to improve absorption of the UV radiation during lithography process for forming a channel region of the display (col. 2, lines 30-36 and col. 6, lines 45-55).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display of Tsuda et al. with the teaching of Mei et al. by forming a semiconductor film composed of the same material as said semiconductor layer in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed to improve absorption of the UV radiation during lithography process.

As to the product-by-process limitations "said inseparable pattern and separable pattern are arranged respectively in different masks and exposed separately; and said inseparable pattern is exposed with a predetermined exposure amount of 20 to 80% of the exposure amount for said separable pattern", it has been recognized that "Even through product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985). See also MPEP 2113.

Response to Arguments

10. Re claims 2 and 4, Applicant's arguments filed August 20, 2004 have been fully considered but they are not persuasive.

Applicant argued that Takatsu refers only to different positions of a single mask during a single exposure while the claimed invention is directed to two masks and two different exposures. The Examiner disagrees with Applicant's remarks since Sawayama already discloses the claimed invention where two different masks with two different exposures are used, one exposure is for the inseparable pattern and the other exposure is for the separable pattern. However, since Sawayama does not disclose the exposure amount for each pattern, the reference of Takatsu is employed for teaching determining proper amount of exposure to light intensity to obtain desired patterns. Accordingly, it would have been obvious that the method of Takatsu is applicable for predetermining exposure conditions for the separable and inseparable patterns of Sawayama so as to obtain an appropriate unevenness of the inseparable pattern and a contact hole of the separable pattern.

Re claims 16 and 17, Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection as shown above.

Allowable Subject Matter

11. Claims 3, 5, 6 and 18 are allowed.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed. Specifically,

Re claims 3 and 5, none of the prior art of record discloses, in combination with other limitations as claimed, a mask for manufacturing a reflection type liquid crystal display comprising a base material and a shading material of at least two layers provided on said base material, said at least two layers including an ultraviolet filter for cutting ultraviolet rays at a predetermined value of 20 to 80 %.

The most relevant references, USPN 5,368,962 of Kiryu et al. and USPN 5,994,157 of Aggas et al., fail to disclose or suggest an ultraviolet filter for cutting ultraviolet rays at a predetermined value of 20 to 80 %. The reference of Kiryu et al. discloses a mask having a shading material comprised of at least two layers which include an ultraviolet filter layer; however, the UV rays are to be cut at a value of more than 99% ((col. 3, lines 34-45). Meanwhile, the reference of Aggas et al. discloses only an UV blocking layer formed of a-Si and having a thickness of from about 200 to 2000 Angstrom for cutting ultraviolet rays at about 80% (col. 7, lines 7-31).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong

11/12/2004

TARIFUR R. CHOWDHURY
PRIMARY EXAMINER